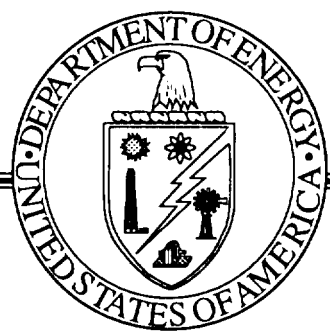
APPENDIX C

FIELD VERIFICATION GUIDE
FOR THE
CHEMICAL SAFETY VULNERABILITY REVIEW



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OFFICE OF ENVIRONMENT, SAFETY AND HEALTH

Field Verification Guide
for the
Chemical Safety
Vulnerability Review

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1.0 Introduction

Based on direction from the Secretary of Energy,[1] the Assistant Secretary for Environment, Safety and Health established the Chemical Safety Vulnerability Working Group to identify, characterize, and prioritize chemical safety vulnerabilities confronting the U.S Department of Energy (DOE).[2] The Secretary's guidance required that special emphasis be given to review of facilities being transferred to, awaiting, or undergoing decontamination and decommissioning. In response, a project plan describing the six phases of the review and establishing a schedule for its completion has been developed and distributed to all affected Departmental elements.[3] A final report on the results of the review is due to the Secretary by July 29, 1994.

This document provides specific guidance to Working Group members, site personnel, and team members participating in the field verification phase of the Chemical Safety Vulnerability Review (also see "Phase III - Field Verification" in the project plan). The field verification process is designed to use independent teams of technical professionals with experience in a variety of environmental, safety, and health (ES&H) disciplines to verify the accuracy and completeness of the data compiled during the field self-evaluation phase of the review. The field verification process offers an opportunity to identify facility-specific chemical safety vulnerabilities and to make informed judgments about the seriousness of the conditions observed. However, the field verification process is not intended to be a site- or facility-specific compliance or risk assessment.

The field self-evaluation phase of the review used a standardized question set developed and distributed by the Working Group to collect data related to chemical safety from 84 facilities located at 29 DOE sites. Self-evaluations began in early March 1994, and the results were due to the Working Group by April 4, 1994. This information was used to make initial determinations about facility-specific chemical safety vulnerabilities and will be used by the field verification teams as a baseline for their field observations. When the self-evaluation data for a particular facility at a site selected to host a verification team indicate no significant concerns related to chemical safety, other appropriate facilities may be substituted for inclusion in the field verification effort.

On receipt of the completed self-evaluation reports, a core group of EH personnel representing the Working Group analyzed the data and selected nine DOE sites to host field verification visits. Field visits will last 10 days, with the three rounds of visits scheduled to begin on April 18, May 2, and May 16, 1994.

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[1] Memorandum from Hazel R. O'Leary to Tara OToole, "Vulnerability Review of Chemical Safety at Department of Energy Facilities," dated February 14, 1994.

[2] Memorandum from Tara O'Toole to all Departmental Elements, "Vulnerability Review of Chemical Safety," dated February 10, 1994.

[3] "Project Plan for the Chemical Safety Vulnerability Review," dated March 14, 1994.

Each team will characterize and prioritize facility-specific chemical safety vulnerabilities at each site visited. Teams will identify vulnerabilities and their potential consequences. Consequences may be of immediate concern or may be projected to be of concern in the future. At the conclusion of each site visit, the team will draft a report of its observations and will conduct an outbriefing for local DOE and contractor line management personnel. Local DOE line organizations will be responsible for developing and approving corrective actions for facility-specific chemical safety vulnerabilities identified during verification visits. Vulnerabilities may be addressed either through an existing action plan or by a new entry into an appropriate tracking system.

2.0 **Verification Methodology**

The goal of each field verification visit is to develop a prioritized list of facility-specific chemical safety vulnerabilities for the site being reviewed. Before arriving at the site, review of the data provided during the field self-evaluation phase will allow team members to develop a list of observations related to potential vulnerabilities for their functional areas. During the onsite portion of the review, team members will visit facilities that participated in the self-evaluation effort to verify reported observations and to look for other conditions and circumstances that may result in chemical safety vulnerabilities. In some instances, facilities or areas that were not involved in the original self-evaluation may provide valuable information for the review. In these cases, team members will coordinate with their site counterparts to arrange for the appropriate walkthroughs or interviews. Finally, the team will prioritize all facility-specific chemical safety vulnerabilities identified for the site being reviewed.

2.1 **Functional Areas**

To facilitate effective team management and to expedite the identification of vulnerabilities across a wide range of technical disciplines associated with chemical safety, each field verification review has been organized to include five functional areas:

- Identification of chemical holdings, including the properties of chemicals located at the facility, the characterization of those chemicals, and an analysis of the inventory.

- Facility physical condition, including engineered barriers, maintenance conditions, chemical systems, safety systems, storage, monitoring systems, and hazards identification.

- Operational control and management systems, including organizational structure; requirements identification; hazard analysis; procedural adherence; maintenance control; engineering and design reviews; configuration control; safe shutdown plans; and site programs for quality assurance, chemical safety, inventoty control, access control, disposal, transportation and packaging, and corrective actions.

- Human resource programs, including technical competence, staffing, training and qualifications, employee involvement, employee concerns, personnel performance requirements, and visitor and subcontractor control.

- Emergency response program, including the emergency response plan, inplant consequences, environmental issues, coordination with the community, and community right-to-know issues.

2.2 **Lines of Inquiry**

The lines of inquiry for each functional area, provided in Attachment 1, have been developed to guide individual team members in the conduct of their reviews. This approach will ensure that each team uses a common strategy for verifying self-evaluation data and identifying facility-specific vulnerabilities. The lines of inquiry have been coded to identify which team member has lead responsibility for reviewing each question. (See Attachment 2 for a matrix depicting the responsibilities of team members in individual functional areas.)

Although the lines of inquiry define the intended scope of the review, they do not restrict the reviewer's activities. The depth to which a reviewer examines issues associated with a given question or topical area should be based on the individual reviewer's professional judgment. The time spent on a specific issue should be directly proportionate to the likelihood that a vulnerability will be identified.

2.3 **Preparation for Verification Visits**

To ensure that time at the site is used effectively, team members for each technical discipline are instructed to develop individual review plans before their arrival. These plans should be brief and should provide a focus for activities conducted during the first few days of the onsite review. Review plans should include the following elements for each facility reviewed:

- A methodology for pursuing the lines of inquiry for which the team member has been assigned primary responsibility;

- A list of observations from field self-evaluation data that may involve chemical safety vulnerabilities and a plan for observing and verifying these observations;

- A list of suspect or incomplete data that may require verification (based on review of the field self-evaluation);

- A list of personnel or positions that may be candidates for interviews; and

- A list of proposed daily activities for the first 3 days of the field verification effort (i.e., for Monday through Wednesday of the first week).

A package of information (see Section 3.2 below) will be provided to each team member before the onsite portion of the verification to allow team members to familiarize themselves with their responsibilities. In addition, before departure for the sites, team members will receive training to familiarize them with the scope and methodology of the field verification process. Team members will brief the team leader on their individual review plans at the team's initial meeting on the first day. Each team member should turn in a copy of his or her individual review plan to the coordinator before 1:00 p.m., the first day on site.

2.4 Onsite Review Methodology

During the first half of the verification visit (Monday through Friday), team members should concentrate on conducting walkthroughs, interviews, and verifications to confirm field self-evaluation data and to observe conditions that may indicate potential chemical safety vulnerabilities. The second half of the verification visit will be used to (1) develop the draft field verification report for the site, (2) document and prioritize facility-specific chemical safety vulnerabilities, and (3) conduct a factual accuracy review with site personnel.

Each team member will work closely with an assigned site counterpart throughout the 10-day review. The site counterpart should be an ES&H professional who is knowledgeable of the programs and personnel associated with the assigned technical area. Each site counterpart will be asked to support a team member in the following manner:

- Answer the team member's technical questions or know where to find the answers;
- Arrange walkthroughs and interviews, as requested;
- Escort and observe the team member's interactions with site personnel (providing additional information or correcting inaccurate information, as appropriate);
- Serve as a liaison between the site and the team member; and
- Arrange for factual accuracy review of appropriate sections of the draft report by appropriate site personnel before factual accuracy review by site management.

During walkthrough of facilities, team members should look for good visual examples of chemical safety vulnerabilities. Team members should notify the team leader and coordinator of all good visual examples of vulnerabilities so that arrangements can be made for photographic support. Photographs of such vulnerabilities may be used in the Working Group's overall report.

The team will conduct meetings at the conclusion of each day to compare observations and identify conditions or circumstances that may involve chemical safety vulnerabilities. Observers representing local DOE and contractor organizations are permitted at these meetings. It should be noted, however, that the meetings will be held solely for the purpose of providing team members with an opportunity to discuss preliminary observations. Site personnel attending these meeting will not generally be invited to participate in the discussions.

Based on input received during the team meeting, team members will document observations using a standardized form (see Attachment 3). Observation forms are intended to provide a means for systematically recording relevant issues on a daily basis. (It should be noted that observation forms can be used for noteworthy practices as well as deficiencies.) One observation form will be used for each separate issue.

Each team member will be responsible for preparing observation forms associated with his or her area of responsibility and will turn them over to the coordinator by 8:30 a.m. each day. The coordinator will assign a unique number to each observation and make copies for distribution to the team leader and the technical editor. Because observation forms will be used solely as a means to record raw data, they will not be turned over to site personnel and will not be published. Observation forms should be updated throughout the first week of the review to reflect the most accurate and detailed information available. At the end of the first week, completed observation forms will be used by team members to develop facility-specific chemical safety vulnerabilities.

Team members and site personnel should work closely throughout the verification effort to ensure that team objectives are accomplished and that the impact on the site is minimized. Accordingly, a Working Group member from the site will be assigned as a member of the team. In addition, the team leader will provide local DOE and contractor management with a daily briefing to summarize the team's observations and to discuss other issues related to the verification visit.

The Working Group member representing the site will serve as a liaison between the team and the site but will not have responsibilities related to conducting the review. This individual will be asked to advise the team leader on issues related to minimizing the impact of the review on the site, conducting factual accuracy reviews, and resolving any conflicts that may arise. The Working Group member representing the site will be given full access to all team working papers; however, he or she will not be allowed to provide copies of these documents to other site personnel.

2.5 **Documentation of Chemical Safety Vulnerabilities**

At the end of the first week (Friday), the team will shift its focus from conducting the review to drafting the site report. A copy of the draft field verification report will be left with local DOE and contractor organizations before the team leaves the site. The body of the report will provide a summary of team activities and observations organized according to applicable functional areas. Detailed technical information to support this summary will be provided in chemical safety vulnerability forms attached to the report as an appendix. (See Attachment 3 for the vulnerability form and Attachment 4 for the report format.)

At the end of the first week of the review, the team will meet to finalize the list of identified facility-specific chemical safety vulnerabilities based on issues documented in observation forms. The team leader will then finalize the assignment of team members to draft chemical safety vulnerability forms. (Responsibility for drafting vulnerability forms may be assigned to team members earlier in the week when chemical safety vulnerabilities begin to be identified.) In addition, the team leaders will finalize the assignment of team members to draft sections of the main body of the field verification report.

Over the weekend, team members will work on drafting and editing their assigned sections of the field verification report and the chemical safety vulnerability forms for which they are responsible. (Guidance related to style for technical reports is provided in Attachment 5.) A peer review session will be held on Sunday afternoon. By Monday morning, team members

will submit the third draft of their assigned sections to the coordinator for review by the team leader and the technical editor.

A factual accuracy review will be conducted by site personnel on Tuesday. Site personnel will be allowed to review controlled copies of the draft field verification report on Tuesday morning, at which time they can prepare questions and comments for the review team. Site personnel will not be allowed to make copies of this version of the draft report. On Tuesday afternoon, team members will make themselves available to their counterparts and other appropriate site personnel to discuss factual accuracy issues. Later in the afternoon, the team will meet with site management representatives (1) to discuss proposed changes to the draft report resulting from the team members' factual accuracy review with their counterparts and other site personnel and (2) to resolve remaining issues.

On Wednesday, the last day of the site visit, the team leader will conduct an outbriefing for site management. A copy of the draft field report, including pertinent appendixes, will be left at the site. Team members will attend this outbriefing to answer questions related to their areas of technical expertise.

Field verification reports will be considered final from a technical point-of-view when the team leaves the site. Editing to enhance presentation and to ensure consistency between the nine field verification reports may be done after the site visit.

3.0 **Team Administration and Responsibilities**

The team leader has overall responsibility for administering the field review team and for ensuring that the field verification visit is conducted according to the provisions of this guide. Changes related to the basic guidance provided herein should be approved by the Working Group Co-Chairmen, the team leader, or both,

During each round of reviews, team leaders will be required to coordinate with each other on a daily basis to ensure consistency between teams and to allow for immediate feedback on relevant issues. At a minimum, team leaders will conduct daily conference calls and provide each other with fax copies of draft reports.

3.1 Team Selection

Each field verification team will consist of a team leader, seven ES&H professionals, a Working Group member (serving as a liaison with the site), a technical editor, and a coordinator. The ES&H professionals will have technical expertise related to chemical safety in one or more of the following areas:

- Management systems,
- Human resources,
- Chemical processes,
- Facility maintenance,
- Industrial hygiene,
- Environmental protection, and
- Emergency preparedness.

Team members have been selected on the basis of their technical competence and experience. Several Working Group members representing line management organizations are being used as team members either as technical experts or as site liaison representatives. Team members will also be provided by the Office of Environment, Safety and Health. All team members will be screened for conflicts of interest. No individual may serve on a team visiting a site at which he or she has assigned line management responsibilities or contractual relationships, with the exception of site liaison representatives. To the extent possible, team members should be selected to participate in all three rounds of the field verification process, thereby ensuring continuity between site reviews. Team leaders have been selected from the list of DOE core group personnel (see Attachment 1 of the project plan for a list of core group personnel).

3.2 Preliminary Verification **Activities**

The compressed timeframe for this review requires that team assignments, site identification, and the verification process will occur in rapid succession. After the data from the field self-evaluations were reviewed, the Co-Chairmen of the Working Group immediately provided verbal and written notification to DOE line management at sites selected to host field verification teams. Contact was also established between team leaders and Working Group representatives at the selected sites. The core group member designated as the chief coordinator of the Working Group is responsible for making necessary arrangements for the team, including verification of hotel accommodations, administrative support, office space, and site counterparts.

The schedule for the verification visits does not include opportunities for advance, indepth study of site documents and programs or for specialized training. To provide team members an opportunity to prepare for their responsibilities, the following information will be provided to team members before travel to the site:

- The field self-evaluation data submitted by the site,
- Documents describing the objectives and methodology for the Chemical Safety Vulnerability Review,
- Applicable organizational charts for the sites and facilities being visited,
- The names and phone numbers of site counterparts,
- Data from the Occurrence Reporting and Processing System and other pertinent background information that will provide insights into facility-specific chemical safety vulnerabilities, and
- Information about hotel accommodations.

3.3 **Responsibilities of Team Members**

Team members' responsibilities relative to specific functional areas and technical disciplines are provided in Attachment 2. A team member will be assigned lead responsibility for each

functional area and for each facility-specific chemical safety vulnerability identified in the field verification report.

Team members are responsible for being prepared to conduct the verification review when they arrive at the site. Each team member will develop an individual review plan as described in Section 2.0 above. Before arriving on site, each team member should contact his or her counterpart to make initial plans for the first few days of the review.

Team members will be responsible for documenting their own observations related to facility-specific chemical safety vulnerabilities on standardized observation forms as described in Section 2.0 above. Observation forms will be submitted to the coordinator each morning as established in the daily schedule. Observation forms will be used to prepare final documentation on facility-specific chemical safety vulnerabilities.

Team members should coordinate their activities in a manner that will minimize the impact of their presence on the site. This objective can be accomplished by working closely with the site liaison person and by providing proposed schedules of interviews and walkthroughs to the coordinator at least 2 days in advance. The coordinator will look for opportunities to combine these activities and will post schedules on a daily basis.

3.4 **Team Interaction with Site**

Each team member should approach the field verification review in the spirit of cooperation and openness. This review is not intended to be a compliance inspection, rather it is a fact-finding review to identify potential problems associated with chemical safety. Team members will be verifying data and identifying conditions and circumstances that may result in chemical safety vulnerabilities, not inspecting the site.

Each team member should work closely with his or her counterpart to ensure that cooperation and openness are maintained. Team members should be accompanied by their counterparts during all verification activities at the site. Counterparts will provide team members with information about site policies and procedures and will arrange for the operation of mechanical or electrical devices. Since the principal function of the field verification effort is to conduct observations and to verify self-evaluation data, team members are instructed not to “test” the site without obtaining the permission of both the team leader and the local DOE office.

Site personnel should be kept apprised of issues being raised by team members. Honest disagreements may persist about how a situation is perceived or how a requirement is interpreted, but site personnel should be given the opportunity to express their views and present their evidence to the team.

Team members employed by contractor or subcontractor organizations may not engage in any marketing activities while performing their duties at the selected sites. Team members must devote their full attention to verification activities, Participation by team members in any work activity not directly related to the verification review must be approved by the team leader. All discussions with site management that are not related to the verification must also be approved by the team leader.

3.5 Team Schedule

Each of three field verification teams will be assigned to visit three different sites. The first round of three site visits will begin on April 18, 1994; the second round will begin on May 2, 1994; and the third round will begin on May 16, 1994. To ensure continuity between each team and each round of reviews, a standardized schedule has been developed and is provided in Attachment 6. Based on the judgment of the team leader, minor changes for individual items on the schedule can be made to accommodate specific circumstances. It should be noted that site visits will begin on Monday morning, which requires that team members travel on Sunday.

A daily management briefing (about 20-30 minutes) conducted by the team leader for a small number of DOE and contractor managers will summarize team observations and coordinate overall team activities. The time, location, and attendance for this briefing should be determined by agreement between local DOE management and the team leader.

Team meetings should last about 1 hour and will focus on issues related to chemical safety vulnerabilities. Each team member should be prepared to discuss relevant observations resulting from the day's activities (e.g., from walkthroughs, interviews, and verifications). Team members should not regard the team meeting as a forum for detailed descriptions of individual activities. A portion of each team meeting will be devoted to development of vulnerabilities from the observations noted and reported by team members.

The coordinator should make arrangements with the site for photographic support to document good visual examples of chemical safety vulnerabilities identified by team members. Team members should direct all requests for photographic support to the coordinator.

After the first round of site visits, team leaders will meet with the Co-Chairmen of the Working Group to discuss lessons learned from their field activities. Changes to the schedule and methodology described in this document will be implemented if necessary.

Attachment 1

LINES OF INQUIRY

Introduction

The lines of inquiry established in this attachment are provided to guide the verification process during site visits conducted by the field verification teams. The lines of inquiry comprise five functional areas and include the following technical disciplines and topics (also see Table 1 below):

- Identification of chemical holdings, including the properties (corrosive, reactive, toxic, carcinogenic, or otherwise hazardous) of chemicals located at the facility.

  Such chemicals may exist in pure form or as mixtures, process intermediates, process byproducts, process wastes, or laboratory wastes. The following issues are of particular importance to the safe maintenance of chemical holdings: (1) proper identification or characterization of types or species and the quantities of each chemical; (2) correct acknowledgement of the properties and hazards associated with these holdings; (3) provision of adequate containers or containment systems, including labeling and storage conditions; and (4) control measures applied to the quality and quantities of chemical holdings.

  The review team's primary concern in this functional area, particularly for those facilities that have ceased to operate or to support chemical operations, is that chemical holdings may never have been adequately controlled or that chemicals have been allowed to accumulate without regard to their potential hazards. Such circumstances may pose substantial risk to workers tasked with D&D of facilities or environmental cleanup.

- Facility Physical condition, including the actual fitness or condition of the facility to support its intended chemical mission safely.

  Issues related to the physical facility include (1) mechanical and structural integrity of chemical tankage, vessels, transfer piping, handling equipment, and other types of chemical containment; (2) integrity of secondary or emergency containment (e.g., spill basins and piping encasement) and other engineered barriers; (3) quality and effectiveness of repair maintenance performed on chemical containment; (4) quality and effectiveness of predictive and preventive maintenance on containment; (5) condition and adequacy of safety systems (e.g., fire suppression and ventilation) to protect workers during routine and off-normal operating conditions; and (6) conduct of appropriate hazards analyses and implementation of change control procedures when operations or processes are modified.

- Operational control and management systems, including organizational structure; procedural adherence; maintenance control; access control; engineering and design reviews; configuration control; safe shutdown plans; and site programs for quality

assurance, chemical safety, inventory control, transportation and packaging, and corrective actions.

Management systems encompass programmatic activities that relate specifically to protecting the environment and the safety and health of the public and of employees working with, or otherwise being exposed to, hazardous chemicals. Such systems are concerned with the safe performance of all operations activities related to hazardous chemicals. Activities are not limited to ongoing production-related processes and operations; they also include those activities related to chemical handling, transportation, storage, treatment, and disposal that are conducted in inactive, standby, remote, or abandoned facilities. They include both routine work and nonroutine work. The term "nonroutine work" includes "nonoperations work" activities performed by onsite and/or offsite contractors and subcontractors. Types of nonroutine work include maintenance, construction, modification to facilities, cleanup of facilities or processing equipment, waste cleanup, and D&D activities.

- Human resource programs, including training and qualifications, staffing, commitment to chemical safety, personnel performance requirements, and internal communications.

  It is crucial for workers to receive adequate training in both site-specific and facility-specific safety. At a minimum, site-specific safety training should include good chemical work practices that apply equally to all site facilities and should emphasize hazard recognition. Facility-specific safety training should address those operations and processes that are contained within, or are under the control of, a particular facility, including training in the safety practices specific to the facility's chemical operations and processes and the identification of the specific hazards associated with that facility. Safety training programs should include comprehensive qualification testing to verify that workers have been effectively trained.

  To ensure worker safety, adequate numbers of qualified staff should be provided for chemical operations and processes. Expectations for each worker's performance in the area of chemical safety should be clearly defined and understood by all concerned parties. All employees should be encouraged to become involved in the development and implementation of chemical safety programs. A program should be in place through which employees can bring their safety concerns to the attention of management.

  Internal formal and informal communication, between workers, supervisors, and managers and with offsite visitors and subcontractors should ensure safety in the workplace and an effective commitment to environmental protection, safety, and health.

- Emergency response program, including (1) response plans for protection of the environment, public safety and health, and worker safety and health in chemical-related emergency scenarios and (2) the physical training and preparation for the execution of those planned responses.

  Emergency planning should be based on specific chemicals maintained in a facility's holdings and on the associated hazards identified in the technical analyses performed under an effective engineering control program. The emergency response program should

maintain the necessary readiness to respond appropriately to any scenario. For the purposes of this evaluation, emergency planning and response should take the following issues into consideration: (1) hazardous chemical releases; (2) inplant consequences; (3) environmental issues; (4) accountability of workers, visitors, and the public; (5) coordination with the surrounding community; and (6) community right-to-know issues.

Questions included under the lines of inquiry have been assigned to the following technical disciplines: management systems (MO), human resources (MT), chemical processes (CP), facility maintenance (FM), industrial hygiene (lH), environmental protection (EN), and emergency preparedness (EP). Each question the lines of inquiry has been coded accordingly.

TABLE 1. MATRIX OF TOPICS FOR THE LINES OF INQUIRY

Functional Area	Lines of Inquiry	Topics
Chemical Holdings	• Inventories	• Complete and Documented Inventory • Containment/Storage • Control of Quality/Quantity
	• Wastes	• Characterization and Control of Waste
Facility Physical Condition	• Structural and Mechanical Integrity	• Containment Systems/Engineered Barriers Integrity • Maintenance Programs * Configuration Management
operational Control and Management Systems	• Management Systems	• Organizational Structure • Roles and Responsibility • Management Systems • Medical Surveillance • Internal Assessment/Lessons Learned
	• Operational Controls	• Procedures for Operation • Procedures for Safe Shutdown
	• Nonroutine Work Controls	• Procedures • Controls
	• Engineering Controls	• Engineering Analysis * Hazards Analysis . Pre-Start Safety Review • Engineering Safeguards
	• Packaging and Transportation Controls	• Onsite Transfers
Human Resources Programs	• Training and Chemical Worker Qualifications	• Training and Qualifications • Staffing Levels
	• Commitment to Chemical Safety	• Employee Involvement “ Employee Concerns Program
	• Personnel Performance	• Performance Standards • Performance Appraisal
	• Internal Communications	• Shift Turnover . Verbal Orders • Documentation
Emergency Response Program	• Emergency Plans	• Evaluations and Accountability/Procedures • External Communications • Supplies and Equipment
	• Emergency Response	“ ERT Training and Availability • Emergency Facilities, Equipment, and Personnel

1.0 Chemical Holdings

1.1 Inventories.

1.1.1 Principal Inquiry: Have all chemicals within a given facility been inventoried and properly characterized, and have the results been formally documented?

(IH) a. Has a comprehensive inventory of all chemicals within the facility (including pure forms, mixtures, intermediates, byproducts, and wastes) been completed? Is this inventory formalized and periodically updated? How is the inventory conducted?

(IH) b. Has a hazards assessment of the chemicals identified by the inventory been performed? If so, has a comprehensive list of hazardous chemicals been developed? Have workers in the facility been notified of the presence of these chemicals? Based on this assessment, have control measures been implemented to restrict access to and protect workers from these hazards?

(IH) c. Are proactive inventory controls used in the facility (e.g., for rotation of stocks and disposal of degraded or aged chemicals?

(IH) d. Have requirements been met for labeling (e.g., for containers, tanks, piping), hazards identification, and warning signs?

(CP) e. Are residual chemicals present in the facility (e.g., in tank heels or other residual chemicals in sink traps and ductwork)? If so, have these been characterized and quantified?

(CP) f. Does the existing or planned chemical inventory pose a Particular threat to the facility or to personel assigned to the facility? Examples include potential quantities of combustible chemicals that, if ignited, could exceed fire protection systems capabilities or potential quantities of carcinogens or toxins that, if released, could exceed safe facility concentration levels or ventilation rates.

1.1.2 Principal Inquiry: Are chemical inventories stored in safe containers (small quantities) or containment (bulk quantities) and arranged in safe and environmentally sound configurations?

(CP) a. Have chemical compatibility and proximity been considered (i.e., with regard to chemical types and quantities)?

(EN) b. Have provisions been made to ensure that drums containing hazardous chemicals are stored in a manner that will prevent or minimize the potential for release of these materials to the environment (e.g., through the collapse of drum stacks, or overheating)?

(IH) c. Do storage cabinets have adequate capacity (volume) and structural capability (shelf loading)? Have the necessary engineering requirements been considered (e.g., access control, tip restraints, fire rating)?

(CP) d. Have the inherent instability of compressed gas cylinders, the potential for container over pressurization, and the location and orientation of large and small containers relative to occupied buildings and work zones been considered?

1.1.3 Principal Inquiry: Are the quality and quantity of each chemical species in the inventory appropriately controlled?

(MO) a. Have controls been established for chemical procurements that emphasize (1) obtaining proper purity and concentration; (2) requiring special notice and approvals for purchase; (3) having appropriate material safety data sheets (MSDS) on file; and (4) requiring conformance to quality assurance and other standards with respect to procurement, receipt, storage, and handling practices?

(MO) b. Are programs in place for the control of chemical inventories to ensure that (1) excessive quantities of hazardous chemicals do not accumulate at a site or within a facility, resulting in increased risk to workers and the environment or to increased consequence of accidents; (2) chemicals that become more hazardous through aging or decomposition are disposed of properly before the "safe storage life" is exceeded; or (3) remote or abandoned facilities are not and do not become storage areas for hazardous or uncharacterized chemicals and chemical wastes?

1.2 Wastes.

1.2.1 Principal Inquiry: **Are hazardous or potentially hazardous wastes characterized to determine constituents? Are these wastes controlled in a manner that minimizes the risk of exposure or injury to workers and the environment?**

(IH) a. Are wastes containing, or thought to contain, hazardous chemicals characterized? If so, are the actual or suspect hazardous wastes controlled in an appropriate manner? Will the systems being used result in a full characterization of the hazardous properties of the waste?

(EN) b. Has the facility implemented procedures for the proper accumulation of wastes? Are procedures available for labeling, drum management, containment, and onsite storage within the allowable accumulation time?

(IH) c. If hazardous chemical wastes are mixed with radioactive wastes (resulting in hazardous mixed wastes), are appropriate precautions taken to protect workers from the effects of the chemicals?

(EN) d. Have all operating exhaust stacks and vents, as well as the sources of fugitive emissions, been inventoried and evaluated to determine which sources require engineering or administrative controls to minimize atmospheric emissions? If needed, have these controls been implemented?

(EN) e. Have all water discharges (e.g., waste, process, sanitary, and storm water) been inventoried and evaluated to determine which sources may require engineering and/or administrative controls to minimize the discharge of contaminants to the environment?

(EN) f. Are routine measurements of both spent "cold" chemicals and mixed wastes performed before disposal? How does the facility conduct hazardous waste determinations?

(EN) g. Has the facility reviewed past chemical operations to determine whether chemical residues remain in areas such as inactive piping, vents, and tanks?

(EN) h. Does the facility have a preparedness and prevention plan to minimize the threat of a hazardous waste release (i.e., separating incompatible wastes)?

2.0 **Facility Physical Condition**

2.1 Structural and Mechanical Integrity.

2.1.1 Principal Inquiry: Is the structural and mechanical integrity of the facility maintained in a condition that is sufficient to prevent the uncontrolled release of hazardous chemicals and to prevent exposure of workers, the public, and the environment to chemicals?

(FM) a. Is the integrity of hazardous chemical containment (e.g., above-ground and underground storage tanks, pressure vessels, and piping) and other engineered barriers properly maintained to ensure that they will perform their intended functions?

(FM) b. Have secondary containment systems for chemical storage areas (i.e., raw material and waste drums, containers, and tanks) been consistently developed, installed, maintained, and inspected?

(FM) c. Are maintenance programs in place to ensure the operability of engineered safety and control systems (e.g., fire protection or building ventilation systems)? If so, do the maintenance programs include the concepts of predictive maintenance, preventive maintenance, and routine periodic surveillance testing of these systems? How does the facility establish preventive maintenance frequencies (e.g., manufacturers' recommendations, past work history)?

(CP) d. From the standpoint of maintaining facility integrity, is a formal engineering analysis or review performed when operations or processes are modified with respect to chemicals, process chemistry, or associated operational parameters or when major repairs are performed on hazardous chemical containment and/or equipment?

(MO) e. When operations or processes are modified, when major repairs are made to hazardous chemical containment and/or equipment, or when modification work is performed on hazardous chemical containment and/or equipment, are the requirements of the configuration management or change control program invoked?

(CP) f. When changes such as those described above are made, are formal hazards analyses performed to verify that the changes are appropriate?

3.0 **Operational Control and Management Systems**

3.1 Management Systems.

3.1.1 Principal Inquiry: Does the organizational structure empower workers to participate in the development and implementation of site ES&H programs?

(MO) a. Does the organizational structure establish a chain of command to identify and empower cognizant individuals to be responsible for developing and implementing site ES&H programs and ES&H programs specific to each facility or operation related to chemical safety?

(MO) b. Does the organizational structure have sufficient flexibility to empower managers and workers alike, in all departments and at all levels, to participate actively in the development and implementation of ES&H programs related to chemical safety?

(MO) c. Have employee roles, responsibilities, and authorities associated with chemical safety been clearly defined? If so, have they been communicated to, and understood by, those employees responsible for carrying out safe chemical practices? Does senior management support and promote safe chemical practices?

3.1.2 Principal Inquiry: Are management systems in place to identify and eliminate or mitigate the effects of chemical hazards?

(MO) a. Are management programs in place to identify all chemical hazards, both general to the site and specific to individual facilities and operations (including waste processing facilities and waste storage facilities, whether they are near other facilities, remote, staffed, or abandoned)?

(MO) b. Are management programs in place to ensure that formal hazards analyses of an appropriate type and complexity are performed for all new and existing processes or operations, including pending waste treatment, waste disposal, or D&D operations?

(MO) c. Are programs in place to eliminate hazardous chemicals through changes in processes or by substituting less hazardous chemicals?

(IH) d. Are safety and health plans in place to ensure that chemical-related safety and health information is maintained current for specific inventories (i.e., type, quantity, physical state, and location) and with respect to the associated hazards and mitigative measures associated with the identified chemicals?

(IH) e. Do the above plans provide for distribution to all employees of safety and health information related to specific hazardous chemicals?

(MT) f. When ES&H-related information for hazardous chemicals is made available to employees, is training provided on retrieving and interpreting that information?

(IH) g. Have programs been implemented effectively to ensure the adequate labeling, hazard warning, and posting of storage vessels, piping, individual containers, and areas of potential release or concentration?

(EN) h. Has the facility implemented programs for safety of operations associated with above-ground and underground storage tanks? Has consideration been given to inventory programs, use of leak monitoring and detection devices, and integrity testing for tanks and piping.

(MO) i. Are controls in place to limit the inventories of hazardous chemicals to quantities that can be handled safely by facility safety systems (e.g., fire suppression and building ventilation systems)?

3.1.3 Principal Inquiry: **Has a** medical surveillance program **been developed and implemented to ensure that workers do not receive excessive exposures to hazardous chemicals?**

(IH) a. Have effective workplace monitoring programs been established at the facility for hazardous and/or toxic chemicals?

(IH) b. Do these programs specifically provide medical surveillance to monitor and control individual worker exposures to all known or suspected chemical hazards?

3.1.4 Principal Inquiry: Are ES&H programs that address hazardous chemicals being continuously improved by analyzing the results of periodic internal assessments and by learning from the experience of other sites or facilities?

(MT) a. Are self-assessments performed to evaluate the effectiveness of ES&H programs? If so, are they performed by managers, workers, or both?

(MT) b. Do self-assessments focus specifically on chemical safety? If so, are they current and accurate? Do they include new chemicals in use and new or revised chemical safety data?

(MT) c. Do self-assessments result in the development of formal reports and specific corrective or mitigative actions for the deficiencies noted?

(MT) d. Do these programs assign corrective actions to responsible individuals, track those actions to completion, and verify their completion or implementation prior to closure?

(MO) e. Are chemical "near-misses," particularly small-scale events, identified and reported ?

(MO) f. Are "lessons learned" (from facility and site experience, from DOE Headquarters, and from other locations) considered when chemical safety programs are modified or improved?

3.2 **Operational Controls.**

3.2.1 Principal Inquiry: Is all work performed in strict accordance with specific work procedures? Are such procedures based on a technical evaluation of potential hazards associated with the work being performed? Have the procedures been prepared specifically for the task(s) being performed?

(IH) a. Have formal laboratory procedures been developed and implemented for all routine and nonroutine chemical laboratory work? If so, do these procedures incorporate chemical safety considerations. Do these procedures address the need for special safety equipment or laboratory apparatus and for personal protective equipment (PPE)?

(CP) b. Have formal chemical processing procedures been developed and implemented for all routine and nonroutine processes? If so, do these procedures incorporate chemical safety considerations. Do these procedures address operation of the installed safety equipment and the need for PPE?

(MO) c. Do procedures provide the following information: (1) clear instructions for all pertinent activities (e.g., startup, normal and temporary operations, recovery from "off-normal conditions," normal shutdown, emergency operations, emergency shutdown); (2) quantitative definition of the safe limits of operation; (3) safety and health considerations in user-friendly terminology, including the precautions required to prevent exposures and the control measures to be taken in the event of exposure; (4) any special or unique hazards, including precursors of pending off-normal operations; and (5) safety systems and their functions? Are procedures consistent with all process safety information? Are they updated when this information is revised?

(IH) d. Have procedures been developed and implemented for the disposal of unneeded or obsolete chemicals and wastes?

3.2.2 Principal Inquiry: Are specific plans and procedures in place to provide for the safe shutdown of processes and systems involving hazardous chemicals?

(MO) a. Are approved plans and procedures in place describing the safe shutdown of processes and systems involving hazardous chemicals?

(MO) b. Are these plans and procedures modified, as necessary, when changes are made to the process chemistry or to the system hardware?

3.3 **Nonroutine Work Controls.**

3.3.1 Principal Inquiry: Are formal (written and approved) procedures developed for each nonroutine work activity involving hazardous chemical facilities and processes?

(MO) **a.** Do procedures provide the following information: (1) clear instruction for performing the activities; (2) ES&H considerations in user-friendly terminology, including the precautions necessary to prevent personnel and environmental exposures and the control measures to be taken if exposures occur; and (3) information specific to any special or unique hazards?

(IH) b. Have adequate controls been implemented for project activities that could result in personnel and environmental exposures to hazardous chemicals but are not directly related to the operation of hazardous chemical facilities or processes (e.g., maintenance work that might use or be involved with hazardous chemicals)?

(CP) c. Have job safety analyses (JSAS) been performed? Are appropriate considerations given to JSAS in work plans before work begins?

(CP) d. Are JSAS based on normal and potential off-normal scenarios (relative to hazardous chemicals) that might include loss of process control, breach of containment, failure of PPE or safety support systems, or fire and explosion?

(FM) e. Are nonroutine contract workers routinely made aware of identified chemical hazards before each job begins? Do these workers receive adequate training on established work control practices? Are they trained and certified in the proper use of safety equipment, safety systems, and PPE?

(FM) f. When containment must be breached or when engineered safety systems must be bypassed or shutdown during maintenance activities, are appropriate measures taken (e.g., emptying the containment) to prevent the release of hazardous chemicals or to protect the public, workers, and the environment against the effects of chemical release?

3.3.2 Principal Inquiry: Are appropriate controls used to limit exposures or otherwise protect involved workers, noninvolved workers, and the public during nonroutine activities associated with hazardous chemicals?

(MO) a. Are access controls in place for chemical operating areas? If so, do access control criteria take into account the following considerations: (1) cumulative personnel exposures, (2) qualification and training of workers and visitors, and (3) specific chemical procedures and operations that are currently being performed?

(FM) b. Do non routine work procedures include the following: (1) use of approved work permits, (2) requirements for acceptance inspection and post-maintenance testing, and (3) special programmatic requirements for performing work safely?

(IH) c. When infrequently performed routine operations involving hazardous chemicals are assigned to facility workers, are the elements of a nonroutine work control program invoked? (Note: This question is oriented toward infrequently performed routine operations for which engineered safeguards do not exist or where existing administrative controls cannot be invoked, thus a JSA must be applied.) If so, do these elements specifically identify the hazards that might be encountered and special protective measures that should be taken?

(FM) d. Does the nonroutine work control program (e.g., for nonroutine work authorization or hot-work permit) clearly define all preventive or mitigative measures to be taken, including (1) necessary communications with operations personnel, (2) access control and personnel accountability (e.g., confined-space entry), (3) mechanical or electrical isolation (e.g., lockout/tagout), (4) emergency contacts for off-normal occurrences or accidents, and (5) appropriate safety equipment and **PPE** to be available for direct or indirect use?

(FM) e. Are nonprocess-related safety systems and equipment (including breathing-air supplies, fire and smoke detection and alarms, fire suppression, chemical surveillance, and PPE) provided and maintained for the protection of workers?

(FM) f. When both routine and nonroutine work are being performed within, or in the vicinity of, a hazardous chemical facility or when there are colocafed workers, offsite subcontractors, or visitors present while hazardous chemical work is being performed, are integrated work control policies or programs in effect to identify and protect all workers and visitors? Do these policies or programs include such elements as access control, job-hazard analysis, special procedures, training, the use of PPE, and the provision of sufficient ES&H oversight?

3.4 Engineering Controls.

3.4.1 Principal Inquiry: Are formal engineering analyses performed for all new or modified hazardous chemical operations or processes?

(CP) a. Is all engineering work relative to the control or containment of hazardous chemicals performed by or under the direction of a trained and qualified **engineering staff?**

(CP) **b.** Are engineering analyses formally documented (i.e., written format and including all assumptions, hypotheses, references, numerical calculations, design "answers" or conclusions, and reviews and approvals, as applicable)?

(CP) c. Are specific engineering analyses performed for new processes or modifications to existing processes, including new processes for waste treatment and D&D?

(CP) **d.** Do engineering analyses address such topics as reaction kinetics, critical limits of operation (e.g., temperature, pressure, and mass quantities), partial or unexpected reactions and associated chemical intermediates or byproducts, consequence of unplanned emergency operation or process shutdown, and so forth? If so, do the results of these analyses become the bases of design or selection of equipment and hardware, or of process controls and safeguards? Are they used to determine the suitability of the facility (or its supporting safety systems) to the chemical operation or process?

(EN) e. Has the facility implemented investigative actions to determine whether surface and subsurface conditions (e.g., groundwater, surface water, soil, sediment, and biota) have been affected by the storage of hazardous waste or chemicals?

(CP) f. Are containers, tanks, pipes, and other primary containment for highly hazardous and toxic chemicals specifically engineered to be highly reliable (e.g., corrosion-resistant materials, appropriate corrosion allowances, and conservative support systems) ?

(CP) 9. Does the design process recognize storage temperature limitations, pressure limitations, and so forth? Does the process include contingencies for exceeding those limits?

(EN) h. Has the facility considered the following issues during the design and installation of above-ground chemical storage tanks: spacing between tanks, tank venting, tank support and anchorage, and material transfer secondary containment features (e.g., spill trays for small quantities, lined basins for bulk quantities, and encased piping for process or transfer systems)?

(MO) i. Is a program in place for formal review and approval of engineering designs or analyses by the responsible ES&H organizations? When particularly crucial or hazardous operations or processes are involved, are these documents reviewed and approved by independent technical experts who were not associated with or responsible for the work?

(EN) j. Has the facility developed and implemented effective construction and operation systems for the management of chemical materials in underground storage tanks? (Consideration should be given to spill and overfill controls, corrosion protection systems, release detection systems, and corrective action measures associated with chemical releases to the environment.)

3.4.2 **Principal Inquiry: Are formal hazards analyses performed for all hazardous chemical operations and processes?**

(CP) a. Are programs in place to require a formal (i.e., documented) hazards analysis of appropriate type and complexity for each new or existing process and operation? If so, do these analyses typically identify and evaluate the hazards involved? Are appropriate measures implemented to control the hazards? (Note that such analyses are necessarily a part of the formal safety analysis report, or SAR, that is required for all facilities.)

(CP) b. Do hazards analyses consider all normal, off-normal, and accident-related scenarios that could expose the public or workers to hazardous chemicals?

(CP) co Are accident or event scenarios that could result in acute or chronic effects to workers, the public, or the environment (but are less significant or less catastrophic than SAR-related scenarios) included in these analyses?

(CP) d. If hazardous chemicals are a prime consideration in the facility safety envelope, do SAR analyses match the types and quantities of chemicals being used and stored in the facility?

(MO) e. Are hazards analyses formally documented, reviewed, and approved in the same manner as engineering analyses?

3.4.3 **Principal Inquiry: Are prestart safety reviews performed before startup of new or modified chemical processes or operations? Is change control and configuration management an element of engineering programs to ensure that all engineering changes are documented once successful startup has been accomplished?**

(MO) a. Are prestart safety reviews of hazardous chemical process and process-related systems performed to ensure that the mandatory portions of Federal regulations and standards have been met? Are nonmandatory engineered safeguards and systems identified as having a preventive or mitigative function in the hazards analysis included, and are they fully operational?

(MO) b. Are quality assurance or change control programs implemented to manage and control changes to new or existing engineering designs?

3.4.4 **Principal Inquiry: Are specific engineering safeguards included in designs and modifications to ensure that hazardous chemical operations and processes are intrinsically safe?**

(FM) a. Is adequate industrial ventilation provided for storage and operating areas? If so, have hazardous chemical exposure limits, airborne chemical concentrations, samplers, detectors, alarms, explosive limits, and compatibility of vapors been considered?

(FM) b. Have inert gas systems (e.g., blanketing or fire suppression) been engineered with due consideration for risk assessment, confined-space entry, line rupture, suffocation, and so forth?

(FM) c. Has the need for piping identification and the potential for disconnection to hazardous or toxic chemical lines been considered in engineering designs (e.g., fittings, backflow prevention)?

(FM) d. Have compressed gas systems been specifically engineered with consideration for the stability of containers, the potential for overpressurization, and the location and orientation of containers relative to occupied buildings or work zones?

(FM) e. Have pressure relief systems for chemical containment been specifically engineered for their application? If so, have provisions been made for scrubbing or treatment of vent gases or containment of vent gases in confined spaces?

(FM) f. Has appropriate consideration been given to above-ground and underground hazardous chemical storage tanks to ensure that any release of these chemicals to the environment is minimized (e.g., leak detection, cathodic protection, or vent scrubbers)?

(FM) g. Are the inventories (chemical species and quantity) of combustible chemicals within the facility reviewed regularly to ensure that existing fire suppression systems are of adequate capacity? Are the installed fire suppression systems compatible with all chemicals present (e.g., a water suppression system in a sodium process room versus a dry chemical or Halon system)?

3.5 **Packaging and Transportation Controls.**

3.5.1 Principle Inquiry: Are onsite transfers of hazardous chemicals conducted in a safe manner?

(FM) a. Are approved procedures in place to define safe packaging and transportation requirements for onsite transfer or en route transit storage of hazardous chemicals?

(MT) b. Have personnel who are responsible for handling, packaging, storing, or onsite transfer of hazardous chemicals been properly trained for their assigned duties?

(FM) c. Have personnel who are involved in the handling, packaging, storing, or onsite transfer of hazardous chemicals been property trained to handle these materials during incidents or off-normal events?

4.0 **Human Resource Programs**

4.1 Training and Chemical Worker Qualifications.

4.1.1 Principal Inquiry: Have workers involved in hazardous chemical operations and processes received specific training in the tasks and procedures for which they are responsible? Have they demonstrated their qualifications to perform work safely? Has the facility conducted an assessment to determine the types, amounts, and requirements for training personnel to manage chemicals?

(MT) a. Do all employees (including full-time, intermittent and temporary workers, supervisors, and managers who are responsible for operations or who provide guidance and interpretation of procedures) receive laboratory-specific or process-specific training related to chemical safety?

(MT) b. Does this training program include hazardous materials (HAZMAT) training for all employees who work in chemical zones?

(MT) c. Are comprehensive indoctrination and generic training relative to chemical hazards provided to new employees before they are assigned to perform work involving hazardous chemicals?

(MT) d. Is refresher training provided to all employees assigned to hazardous chemical duties, as defined above, at intervals of at least every 3 years or on an as-needed basis?

(MT) e. Is orientation training provided for subcontractors and visitors before they are allowed to enter areas of the facility where chemical hazards may exist?

(MT) f. Does the training of personnel involved with hazardous chemicals result in an understanding of any of the following: (1) hazards associated with chemicals used in or resulting from a specific procedure or process; (2) procedures used to perform laboratory activities or operate processes safely; (3) safe limits of operation; (4) precursors or physical indicators of pending unsafe “procedures” or process operating conditions; (5) appropriate actions to be taken in response to process upset or emergency process conditions; (6) opportunities available for employees to contribute to process safety improvement; and (7) SARA Title lll requirements for community right-to-know?

4.1.2 Principal Inquiry: Are staffing levels adequate to ensure that employees assigned to chemical-related operations and processes are able to conduct their work safely?

(MT) a. **Are** staffing levels sufficient to ensure that workers who perform hazardous-chemical-related operations and processes do not receive excessive chemical exposures (e.g., one-time or time-weighted average), are not required to work overly long hours, or do not circumvent established safe work practices and procedures?

(MT) b. Are staffing levels sufficient to permit use of the "buddy" system for hazardous chemical operations involving a significant degree of risk to workers, the public, or the environment?

(MT) c. Is a sufficient support staff of qualified ES&H professionals provided to oversee routine and nonroutine activities involving hazardous chemicals?

(MT) d. Are management plans in place to define required staffing levels and the appropriate mix of training and skills required to conduct safe operations involving hazardous chemicals? If so, are staffing levels in these plans based on JSAS specific to the tasks being performed?

4.2 **Commitment to Chemical Safety.**

4.2.1 Principal Inquiry: Does the site safety culture clearly demonstrate recognition of and respect for the inherent dangers of hazardous chemical operations and processes?

(MT) a. Is an employee concerns program in place to encourage workers to report unsafe conditions or practices related to hazardous chemicals?

(MT) b. Do workers and supervisors know how to report unsafe conditions or practices associated with hazardous chemicals? If so, do workers feel inhibited about using the reporting process?

(MT) c. Are documented safety concerns (e.g., from the employee concerns program) promptly addressed by management?

(MT) d. Are documented safety concerns analyzed for trends and root causes and used by management to correct chemical safety deficiencies?

(MT) e. Is employee involvement (e.g., participation in process-hazards analysis) solicited by management for matters related to chemical safety?

(MT) f. Do workers have stop-work authority? If so, do they understand the limits of that authority? Would they feel free to exercise that authority if they observe unsafe conditions or practices?

4.3 Personnel Performance.

4.3.1 Principal Inquiry: Are personnel responsible for handling, processing, or storing hazardous chemicals or hazardous waste performing their assigned duties safely?

(MO) a. Are chemical safety performance standards and expectations clearly stated to all employees involved in handling, processing, or storing hazardous chemicals and wastes?

(MO) b. Is an effective performance appraisal program in place to hold employees accountable for chemical safety performance?

4.4 Internal Communications.

4.4.1 Principal Inquiry: Are internal communications sufficiently effective to prevent situations that could lead to serious chemical-related accidents or injuries or releases to the environment?

(MO) a. Are routine communications thorough (e.g., verbal orders, shift turnover)? Do they place appropriate emphasis on worker safety and health and the environment as these issues relate to hazardous chemical operations and processes?

(MO) b. Is a sufficient support staff of qualified ES&H professionals provided to evaluate situations and conditions, to advise supervisors and workers of potential hazards, and to oversee hazardous chemical activities?

5.0 **Emergency Response Program**

5.1 Emergency Plans.

5.1.1 Principal Inquiry: Are sitewide emergency plans in place to protect workers, the public, and the environment in the event of a major chemical-related accident?

(EP) a. Has a sitewide emergency plan been developed to direct all necessary activities to protect workers and the public? If so, are site emergency plans based on an evaluation of real conditions and potential hazards, including hazardous chemical inventories and associated accident scenarios identified in the formal hazards analyses?

(EP) b. Do site emergency plans address catastrophic accidents and events **as well as** less significant accidents and events that may include limited exposures, spills, and unexpected chemical reactions?

(EP) c. Does each individual facility involved with the handling, storage, use, or disposal of hazardous chemicals have a facility-specific emergency plan that is based on an evaluation of real and potential hazards, including hazardous chemical inventories and associated accident scenarios identified by formal hazards analyses?

(EP) d. Has an emergency plan been prepared describing actions that should be taken by facility personnel in response to sudden or nonsudden releases of hazardous chemicals or hazardous waste to air, soil, or surface water?

(EP) e. Are employees trained in their respective duties and responsibilities as set forth in the site and facility emergency plans? Is training reinforced by periodic drills?

5.1.2 **Principal Inquiry: In the event of a major chemical-related accident, do emergency plans address the evacuation of and accountability for workers and members of the public who may be in close proximity to the site or facility?**

(EP) a. Do site or facility emergency plans provide for the notification and evacuation of plant personnel? Likewise, do these plans provide for accountability of plant (site or facility) personnel after the evacuation?

(EP) b. Do the site or facility evacuation plans provide for the notification and controlled evacuation of the public from high-risk areas that are adjacent to the site (i.e., during catastrophic events)? Have these plans been coordinated with local communities?

(EP) c. Has a life-safety disaster or warning system (site and public, as applicable) been installed at the site or facility? If so, is the system maintained and tested regulary?

(EP) d. Do site emergency plans provide for the notification of offsite authorities and emergency response teams (e.g., HAZMAT, medical, fire, environmental, security)? If so, are interface agreements (memorandums of understanding, or MOUS) in place with such agencies? Have meetings been held with the local community to plan for catastrophic releases? Has the site conducted modeling to identify the receptors of and potential impacts from chemical releases?

(EP) e. Is the plant medical staff alerted to and kept up-to-date about chemical hazards?

(EP) f. Has a contact list been prepared to identify outside organizations, including the DOE emergency operations center (EOC), in the event of a large chemical emergency?

5.1.3 Principal Inquiry: Are appropriate supplies and equipment maintained at the site or facility to provide for the effective mitigation of the effects of hazardous chemical accidents?

(EP) a. Are safety showers, eyewash stations (with appropriate freeze protection, flow alarms, flow capacity, and temperature control), and other installed safety equipment provided, properly maintained, and periodically inspected?

(EP) b. Is the control of PPE, including chemical decontamination and repair, appropriate and effective? Are sufficient quantities and types of PPE available to respond to the identified emergencies?

5.2 Emergency Response.

5.2.1 Principal Inquiry: Is an emergency response team (ERT) trained and available at the site to respond to, monitor, and control the effects of hazardous chemical accidents and events?

(EP) a. Is an onsite ERT maintained to respond to chemical accidents and emergencies? Are specific procedures developed to ensure team effectiveness. Are the members trained and qualified to those procedures?

(EP) b. Are the above procedures and training based on potential hazards, including the hazardous chemical inventories and associated accident scenarios identified in the formal hazards analyses?

(EP) c, Are adequate supplies of PPE maintained for emergency response, and are ERT members trained in its use? Is this emergency PPE specifically selected for the chemical hazards represented by current inventories?

(EP) d. Are emergency materials and supplies (including reagents for treatment of personnel after exposures, engineered emergency barriers, containment, and spill control kits) provided for the potential chemical hazards?

(EP) e. After emergency conditions have stabilized, is a formal accident investigation or critique of events typically performed? If so, does this effort include (1) identification of root and contributing causes, (2) evaluation of historical events related to the accident, (3) dissemination of the lessons learned, and (4) definition of corrective actions to be taken to prevent future accidents?

5.2.2 **Principal Inquiry: Can emergency facilities, equipment, and personnel support site and facility emergency operations involving hazardous chemicals?**

(EP) a. Are emergency facilities (including an EOC) adequately sized, equipped, and maintained to support emergency responses to chemical-related incidents?

(EP) b. Are drills involving chemical hazards scheduled and conducted to develop and maintain the knowledge and skills of emergency personnel and to confirm the adequacy and readiness of emergency facilities and equipment?

(EP) c. Do these drills involve crucial onsite and offsite support functions, such as fire protection, personnel and environmental monitoring, and spill control? If so, do these drills confirm the readiness of the site and the supporting public agencies to respond to chemical-related emergencies?

(EN) d. Has the facility adequately identified the hazards associated with the release of hazardous materials and wastes? Are the hazardous properties of the chemicals known, individually and collectively? Is the emergency response document comprehensive in nature?

References

29 CFR 1910.119	Process Safety Management of Highly Hazardous Chemicals (6-I-92)
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.1200	Hazard Communication (9-23-87)
29 CFR 1910.1450	Occupational Exposures to Hazardous Chemicals in Laboratories (5-1-90)
DOE 5480.4	Environmental Protection, Safety, and Health Protection Standards (5-1 5-84)
DOE 5480.23	Nuclear Safety Analysis Reports (4-30-92)
DOE 5481.1 B	Safety Analysis and Review System (9-23-86)
DOE 5483.1 A	Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities (6-22-83)
DOE 6430.1 A	General Design Criteria (4-6-89)

Attachment 2

MATRIX OF TEAM MEMBERS' AREAS OF RESPONSIBILITY

Functional Area	Team Member Area of Responsibility y	Functional Area Attributes
Identification of Chemical Holdings	•Industrial Hygiene •Chemical Processes Safety •Environment	•Chemical Systems •Safety Systems •Chemical Storage •Properties of Chemicals •Inventory Analysis •Chemical Characterization •Inventory Control
Facility Physical Condition	•Maintenance	•Engineered Barriers •Maintenance Programs •Safety Systems •Configuration Control
Operational Control and Management Systems	. Management and Operations •Industrial Hygiene •Emergency Preparedness •Management and Training	•Procedural Adherence •Design Review •Hazard Analysis •Quality Assurance Program •Engineered Barriers •Safety Systems •Configuration Control •Transportation and Packaging •Corrective Actions •Personnel Monitoring
Human Resource Programs	• Management and Training . Management and Operations	•Training and Qualifications •Staffing •Visitor and Subcontractor Control
Emergency Response Program	Ž Emergency Preparedness •Environment	•Community Right-To-Know •Emergency Plan •Environmental Issues •Inplant Consequences
Team Management	. Team Leader	•Control of Team Activities •Communication with M&O and DOE Management
Field Verification Report	•Team Leader •Technical Editor	•Technical and Factual Accuracy •Clarity and Style
Report Preparation	•Coordinator	•Clerical Support •Printing •Schedules •Document Cent rot

Team Members: Team Leader (1), Industrial Hygiene (1), Chemical Process (1), Maintenance (1), Management/Operations (1), Management/training (l), Emergency Preparedness (1), Environmental Protection (1), Coordinator (l), Technical Editor(1), and Site Liaison (1),

ATTACHMENT 3

FIELD VERIFICATION FORMS

Standard forms (formats) have been developed for recording observations and vulnerabilities. These forms will be available to team members in electronic as well as hard-copy versions.

CHEMICAL SAFETY VULNERABILITY REVIEW
OBSERVATION FORM

DATE:

Site/Facility:

Team Member:

Observation Number:

Functional Area(s):

1. Identification, (Provide Brief Description.)

2. Basis. (Provide all necessary information leading to identification of the observation, including applicable codes and standards.)

(Team Member, Date)

CHEMICAL SAFETY VULNERABILITY REVIEW
VULNERABILITY FORM DATE:

Site/Facility:

Lead Team Member:

Vulnerability Number:

Functional Area(s):

1. Brief Description of Vulnerability. (Use 1-10 words.)

2. Summary of Vulnerability. (Use 1-3 sentences.)

3. Basis. (Provide all necessary information leading to identification of the observation, including applicable codes and standards.)

a. Requirements:

b, Chemicals Involved:

c, Relevant Self-Evaluation Data:

d. Contributing Causes:

e. Potential Consequences:

CHEMICAL SAFETY VULNERABILITY REVIEW
VULNERABILITY FORM **DATE:**

Site/Facility:

Lead Team Member:

Vulnerability Number:

Functional Area(s):

4. Supporting Observations.

_____
(Team Leader, Date)

ATTACHMENT 4

FIELD VERIFICATION REPORT FORMAT

Executive Summary (about 1 page)

1.0 Introduction

- 1.1 Purpose and Scope (about ½ page)
- 1.2 Site Description (about ½ page)
- 1.3 Facilities Visited (1 paragraph per facility)

2.0 Summary of Results (includes addressing the verification of data)

- 2.1 Identification of Chemical Holdings (about 1 page)
- 2.2 Facility Physical Condition (about 1 page)
- 2.3 Operational Control and Management Systems (about 1 page)
- 2.4 Human Resource Programs (about 1 page)
- 2.5 Emergency Response Programs (about 1 page)

3.0 Categorization and Prioritization of Vulnerabilities

- 3.1 Criteria (about ½ page)
- 3.2 Discussion of Facility-Specific Vulnerabilities (1 -2 pages)

Appendixes:

A. Team Composition
B. Team Bios
C. List of Documents
D. List of Contacts
E. Vulnerability Forms
F. Selected Acronyms

Attachment 5

TECHNICAL REPORT STYLE

Writing style is the cumulative effect of the writer's choice of words and phrases, sentence structure, emphasis, and arrangement of material. In technical writing, an effective writing style will not intrude on the communication of facts, rather it will provide a basis for transmitting information clearly and concisely. Good technical writing is not apparent until it falters. Inconsistent or inappropriate wording, sentence structure, or punctuation distracts the reader and distorts meaning. For more detailed guidance related to style, ask the team editor for a copy of EH-30 Instruction 30.40.03, "Style Guide for the Office of Performance Assessment," dated December 17, 1993.

Plain English

Use "plain English," not bureaucratic and technical jargon, for all technical communications. The use of plain English in Government documents is official policy.

In keeping with this guidance, use familiar words. Concise and clear writing increases reading speed and comprehension. Make writing readable and understandable by using familiar words. Such words tend to be short and are often used in conversation.

Less Familiar	Familiar
utilize, employ	use
accumulation	buildup
prior to	before
proceed	go on, go
facilitate	permit, ease
in addition	too, also
following	after

Use "active" verb forms and select "strong" verbs instead of "long" verbs.

Long	(Short) Strong
accomplish	do, finish
fabricate	make
perform	do, make
prevent from	keep from

Avoid disguising a strong, active verb as a noun that functions as the object of a weak verb.

Hidden Action Verb	Strong
make an inspection	inspect
perform a verification	verify
take the measurement	measure

Use words and phrases with precise meanings. Words and phrases that do not have precise meanings should be avoided. "Subjective" adjectives, adverbs, and phrases make the reader interpret (in his or her own judgment) the depth, degree, importance, or seriousness of the item being presented.

Examples: very, immediately, significant, as soon as possible, adequate

Sentence Structure

Arrange words into sentences and sentences into paragraphs so that the meaning is clear on first reading. Build concise sentences. Economy in writing is achieved by omitting needless words and phrases and by phrasing information succinctly.

Acronyms

Minimize the use of acronyms and abbreviations.

- Define each acronym at its point of introduction in the report. Avoid improvising your own acronyms.

- Do not use the apostrophe with plural acronyms or dates (e.g., ORRS, 1990s).

References

Identify all documents reviewed during the evaluation or referenced in the report.

- Maintain a list of all documents reviewed. A comprehensive document list will be included as an appendix to the report.

- List each documents by its number, title, revision number, and date. Example: DOE/EH-0282, Task Group Report to the Assistant Secretary for Environment, Safety and Health on Oversight of Chemical Safety at the Department of Energy, dated November 1992. Accurate and complete information is essential.

- Underline or italicize the titles of manuals and published reports (Example: DOE-X2X, Environment, Safety, and Health Manual, January 1993). The titles of procedures and similar documents are put in quotation marks (Example: SOP 1.10-6, "Safety and Health Training Requirements for Visitors," January 23, 1994).

Numbers

Spell out the numbers "one" through "nine" unless a specific numerical value is being cited. Use numerals for 10 and higher. Use commas for four-digit numerals, 1,000 or greater. Note that units of time and measurement are always expressed in numerals (e.g., 2 years, 6 feet).

ATTACHMENT 6

DAILY SCHEDULE

Day 1 (Mon.)

8:30 a.m.	Badging, orientation, and site training for team members.
10:30 a.m.	Team leader briefs site management on verification visit objectives and activities. Site briefs team on self-evaluation (including information on facilities reviewed).
11:55 a.m.	Team member introductions to site counterparts.
p.m.	Team members conduct interviews, walkthroughs, and verifications with counterparts.
5:00 p.m.	Team meeting. Team members brief team leader on individual review plans and any initial observations. Team members provide updated schedules through Wednesday to coordinator.

Day 2 (Tues.)

8:00 a.m.	Team leader meets with site management. Editor assembles and edits Team Composition (Appendix A) and Team Biographical Sketches (Appendix B).
8:30 a.m.	Initial observation forms based on reviews of field self-evaluation data and first-day activities due from team members to coordinator. Coordinator provides copies to team leader and editor.
a.m./p.m.	Team members conduct interviews, walkthroughs, and verifications with counterparts.
5:00 p.m.	Team meeting to discuss observations. Updated schedules through Thursday due to coordinator. Team members provide editor with initial document and contact lists to be included in Appendixes C and D.

Day **3** (Weds.)

8:00 a.m.	Team leader meets with site management. Editor completes Team Composition and Team Biographical Sketches and begins to assemble Criteria (Section 3.1), List of Documents (Appendix C), List of Contacts (Appendix D) and Selected Acronyms (Appendix F).
8:30 a.m.	Team member observation forms due to coordinator. Coordinator provides copies to team leader and editor.

Day 3 (Weds.)

a.m./p.m.	Team members conduct interviews, walkthroughs, and verifications with counterparts.
5:00 p.m.	Team meeting to discuss observations. Updated schedules through Friday due to coordinator. Team members provide editor with updates to document and contact lists for Appendixes C and D.

Day 4 (Thurs.)

8:00 a.m.	Team leader meets with site management.
8:30 a.m.	Team member observation forms due to coordinator. Coordinator provides copies to team leader and editor.
a.m./p.m.	Team members conduct interviews, walkthroughs, and verifications with counterparts.
5:00 p.m.	Team meeting to discuss observations. Updated schedules through Friday due to coordinator (team members should identify their requirements for administrative support over the weekend). Team members receive assignments for drafting sections of field verification report from team leader. Team members provide editor with updates to document and contact lists for Appendixes C and D.

Day 5 (Fri.)

8:00 a.m.	Team leader meets with site management.
8:30 a.m.	Team member observation forms due to coordinator. Coordinator provides copies to team leader and editor.
a.m./p.m.	Team members conduct interviews, walkthroughs, and verifications with counterparts.
3:30 p.m.	Final observation forms due from team members to coordinator. This is the deadline for any new observation forms. Coordinator provides copies to team leader and editor.
4:00 p.m.	Team meeting to categorize facility-specific vulnerabilities based on the observation forms that have been submitted throughout the week, Team members receive assignments for drafting vulnerability forms from team leader. Team members provide editor with updates to document and contact lists for Appendixes C and D.

Day 6 (Sat.)

a.m.	Team members work independently as required to complete first draft of assigned field verification report sections and vulnerability forms.
3:00 p.m.	First draft of assigned field verification report sections and vulnerability forms due from team members to coordinator. Coordinator provides copies to team leader and editor.
p.m.	Editor provides feedback to team members.

Day 7 (Sun.)

a.m.	Team members work independently as required to complete second draft of assigned field verification report sections and vulnerability forms based on feedback from team leader and editor.
12:30 p.m.	Second draft of field verification report sections and vulnerability forms due to coordinator.
1:30 p.m.	Coordinator provides copies of all draft field verification report sections and vulnerability forms to team members. Team members prepare for peer review.
3:00 p.m.	Team meeting to conduct peer review of second draft of field verification report and vulnerability forms.

Day 8 (Mon.)

8:00 a.m.	Team leader meets with site management.
9:00 a.m.	Third draft of assigned field verification report sections and vulnerability forms due from team members to coordinator. (A disk with this information should also be turned over for further control by the team leader and editor.)
a.m./p.m.	Team members should conduct followthrough work to verify any questionable information.
2:00 p.m.	Team meeting to review and prioritize identified facility-specific chemical safety vulnerabilities.

Day 9 (Tues.)

8:00 a.m.	Team leader meets with site management. Coordinator makes controlled copies of draft field verification report available for site factual accuracy review.

Day 9 (Tues.)

9:00 a.m.	Team leader develops slide presentation for outbrief.
noon	Team members meet with site counterparts to discuss factual accuracy issues.
2:00 p.m.	Meeting between site representatives and team to review factual accuracy changes as a result of meeting with counterparts and to resolve any remaining issues.
4:00 p.m.	Team members work with team leader and editor to ensure that changes made to field verification report as a result of the factual accuracy review are properly incorporated. Editor submits final changes to coordinator for correction and final draft preparation.

Day 10 (Weds.)

8:30 a.m.	Editor and coordinator perform final quality check of draft field verification report before reproduction.
10:00 a.m.	Team leader conducts outbrief with site management and delivers copy of final draft of field verification report. Team members should be prepared to answer detailed questions.
10:45 a.m.	All team members leave the site,